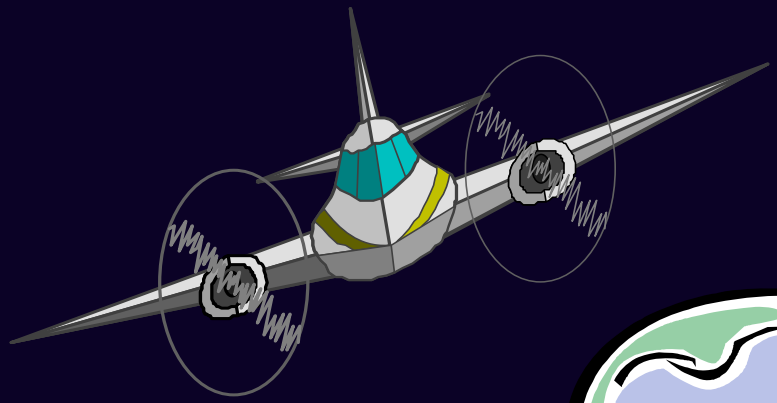
World Airline Safety: The Century So Far



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How safe is it to fly?

Well, how should we *measure* aviation safety?

Given that a passenger's greatest fear is of being killed in a plane crash, there is a natural interest in statistics about the likelihood of that outcome.

An NTSB statistic:

fatal accidents per 100,000 flight hours

Two problems with the ratio fatal accidents per 100,000 flight hours:

The *numerator* and the *denominator*!

- **The generic term *“fatal accident”* blurs the distinction between a crash that kills one passenger out of 300 and another that kills 300 out of 300.**

- **Measuring activity by *“flying hours”* misses the point that most accidents occur on landing or takeoff.**

What about *hull losses per 100,000 departures*?

(This is a popular one.)

Consider two hull losses in 2000:

- **Southwest Airlines, Boeing 737, Burbank, CA**

  Passengers on board: **137**

  Passengers killed: ***0***

- **Alaska Airlines, MD-80, off Los Angeles**

  Passengers on Board: **83**

  Passengers Killed: ***83***

No difference?

Why not the simple ratio “passengers killed to passengers carried?”

Measure of Safety Performance
Over a Past Period:

Death Risk Per
Randomly Chosen Flight

Question:

If a person chooses a flight at random from among those of interest (e.g. UK domestic jet flights over the period 1990-99), *what is the probability that she will not survive it*?

This *death risk per flight* statistic has conceptual advantages compared to the other statistics just discussed.

What Conceptual Advantages?

- **Ignores length and duration of flight, which are virtually unrelated to mortality risk**
- **Weights each crash by the *percentage* of passengers killed**
- **Easy to calculate and understand**

First-World Domestic Jet Services

Death Risk per Flight, 1990-99:

1 in 13 million

At this level of risk, a citizen is 2.5 times as likely to win the *jackpot* in the Mass Millions lottery as to perish on her next flight.

(This comparison brought scant comfort to nervous air travelers.)

At a mortality risk of *1 in 13 million* per flight, a passenger who took one flight per day would on average travel for *36,000* years before dying in a plane crash.

Passenger Mortality Risk for Various World-wide Jet Services, 1990-99

Type of Service	Death Risk per Flight
First-World Domestic	1 in 13 million
International within First World	1 in 6 million
International Between First And Developing Worlds	1 in 1 million
Within Developing World	1 in 500,000

But what about the *first half decade* in this century (2000-2004)?

(Funny you should ask.)

Accidental Death Risk Per Flight for Domestic Jet Services, 2000-2004

United States **0** **(!!)**

Rest of First World **0** **(!!)**

(70 million flights performed)

Accidental Death Risk for Various World-Wide Jet Services, 2000-2004

Type of Service	**Death Risk per Flight**
First-World Domestic	***absolute zero***
International within First World	**1 in 7 million**
International Between First And Developing Worlds	**1 in 1.5 million**
Within Developing World	**1 in 1.5 million**

(A world of improvement!)

What about Prop Planes?

Death Risk per Flight, First-World Domestic:

1990-99	***1 in 2.5 million***
2000-04	***1 in 5 million***

Overall Death Risk per Jet Flight, 2000-04

First World Carriers *1 in 20 million*

Developing-World Carriers *1 in 1.5 million*

Does this difference mean that, *given a choice between flying a First World airline and a Developing World one*, we should opt for the former?

Death Risk per Jet Flight *Between First World City and Developing World City* On Two Groups of Airlines, 2000-04

First-World Carrier ***1 in 1.5 million***

Developing-World Carrier ***1 in 1.5 million***

Thus, on the routes on which First and Developing World airlines compete, the difference in their safety records *withers away.*

Of course:

We lost it all on a Tuesday in September.

Overall Death Risk per Domestic US Jet Flight

1990-99	***1 in 15 million***
2000-04	***1 in 10 million***

All the safety gains over 2000-04 were erased when four planes crashed in the 9/11 catastrophe.

So, where are we?